

AMSAT News Service Weekly Bulletins

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AMSAT NEWS SERVICE

ANS-028

ANS is a free, weekly, news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

Please send any amateur satellite news or reports to:

ans-editor@amsat.org

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SB SAT @ AMSAT \$ANS-028.01

End of PCSAT-1 Full Sun Digipeater Operations

AMSAT News Service Bulletin 028.01

From AMSAT HQ SILVER SPRING, MD.

January 28, 2007

To All RADIO AMATEURS

BID: \$ANS-028.01

Bob Bruninga, WB4APR, writing from the US Naval Academy Satellite Lab in Annapolis, Maryland reports, "We've reached the end of PCSAT-1 packet digipeater operations from the most recent full sun period."

During the 1/19/07 afternoon pass over USA, PCSAT-1 was overloaded over the west coast and crashed back to W3ADO-1 at 1850z. But one minute later ground controllers had AOS at the Naval Academy ground station and recovered it to PCSAT-1 and digipeating.

But the number of users was just so high, that there was no way PCSAT-1's batteries would survive the next eclipse. So after 8 minutes of operations and just prior to LOS, the Naval Academy turned off the digipeater and set the MYCALL to NODIGI as a way of letting users know the digipeater was off.

This is probably the end of this PCSAT-1 operating period. Ground controllers will see if the NODIGI will hold. But eclipses still get longer and eventually PCSAT-1 will be back to resetting on every orbit and be practically useless except mid-day sunnyside passes for a lucky packet or two.

The next full recovery period will be the second week in March.

[ANS thanks Bob Bruninga, WB4APR at the US Naval Academy Satellite Ground Station for the above information]

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SB SAT @ AMSAT \$ANS-028.02
OSCAR 11 Request for Reports

AMSAT News Service Bulletin 028.02
From AMSAT HQ SILVER SPRING, MD.
January 28, 2007
To All RADIO AMATEURS
BID: \$BID:U2RPT129.CWV

TELEMETRY AND REPORTS WANTED!

To investigate the date problem mentioned below, I would welcome some telemetry from different parts of the world, at times when the orbits do not pass over the UK. These times are approximately from 10:00 to 16:00 and from 19:00 to 04:00 UTC. If you don't have a decoder, I can now accept short WAV files of good audio, duration up to 30 seconds.

I would also like reports of reception around the times of expected beacon switch ON and OFF. No telemetry wanted, just when you listen, and whether you heard, or didn't hear the bird. Please e-mail to the address below.

During the period 29 December 2006 to 23 January 2007, the satellite was heard from 08 to 18 January. Good steady signals have been heard on all passes, and excellent copy of the telemetry obtained.

The on-board clock has maintained accurate time, over the reporting period, gaining 2.5 seconds. However the hour counter sometimes shows an error of of 10 hours, ie. in its most significant digit. The 'day of the week' counter operates reliably, zero representing Thursday.

The date counter appears to be incrementing correctly, but the day of the month is not reset to one, at the end of each month. Possibly, it resets to 41, ie. the unused bit representing 40 permanently stuck at a one. On 17 January the date was shown as 51 December 2006. Further investigation is required to establish exactly how the date counter changes.

If the satellite's watchdog timer continues to operate normally, the beacon should switch ON around 28/29 January 2007. The satellite is in full sunlight at the present time, and will remain in this state until mid-April 2007, when eclipses start again.

I am indebted to Bob G4VRC and Dean AL7CR for their reports. Reports around the times of the expected beacon switch ON/OFF, are especially useful. Many thanks.

The current status of the satellite, is that all the analogue telemetry channels, 0 to 59 are zero, ie they have failed. The status channels 60 to 67 were still working. The spacecraft computer and active attitude control system have switched OFF, ie. the satellite's attitude is controlled only by the passive gravity boom gradient, and the satellite is free to spin at any speed. When telemetry was last received it showed that one of the solar arrays had failed, and there was a large unexplained current drain on the main 14 volt bus. After 22 years in orbit the battery has undergone around 100,000 partial charge/discharge cycles, and observations suggest that it cannot power the satellite during eclipses, or sometimes during periods of poor solar attitude.

The watchdog timer now operates on a 20 day cycle. The ON/OFF times have tended to be very consistent. The average of many observations show this to be 20.7 days, ie. 10.3 days ON followed by 10.4 days OFF. However, poor

solar attitude may result may result in a low 14 volt line supply, which may cause the beacon to switch OFF prematurely, and reset the watchdog timer cycle. When this occurs, the beacon is OFF for 20.7 days.

The Beacon frequencies are -

VHF 145.826 MHz. AFSK FM ASCII Telemetry

UHF 435.025 MHz. OFF

S-band 2401.5 MHz. OFF

Listeners to OSCAR-11 may be interested in visiting my website. If you need to know what OSCAR-11 should sound like, there is a short audio clip for you to hear. The website contains an archive of news & telemetry data. It also contains details about using a soundcard or hardware demodulators for data capture. There is software for capturing data, and decoding ASCII telemetry. The URL is www.users.zetnet.co.uk/clivew/

[ANS thanks Clive, G3CWV, for the above information]

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SB SAT @ AMSAT \$ANS-028.03
OSCAR 7 News

AMSAT News Service Bulletin 028.03
From AMSAT HQ SILVER SPRING, MD.
January 28, 2007
To All RADIO AMATEURS
BID: \$ANS-028.03

Yesterday afternoon I had the distinct pleasure of working some DX on A0-7 mode B from here in subtropical Florida. I caught a 4 degree max pass to the northeast that eventually covered a good bit of northwestern Europe, and had the pleasure to catch G1WPR in I093 finishing up with K3SZH. Signals were 55 with some QSB on my uplink, probably due to all the energy wasted in heating the neighborhood palm trees. My QTH does not have what anyone could consider a clear horizon! As I was going LOS I also heard I believe W3JZ working G1WPR. At the time the footprint extended across the US from Idaho to Central Florida, and just about all of Canada, so the opportunity to work some satellite DX is there for many.

The 24 hour timer continues to change modes while the satellite is in continuous illumination, with the mode change occurring around 1130 UTC. Eclipses return April 3rd, 2007, and we expect the timer to be interrupted near this date. A good website to check to quickly find out what mode it is in can be found at: <http://oscar.dcarr.org/> .

Good Luck and enjoy!

[ANS thanks Drew, K04MA, for the above information]

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SB SAT @ AMSAT \$ANS-028.04
ARISS Status - 26 January 2007

AMSAT News Service Bulletin 028.04
From AMSAT HQ SILVER SPRING, MD.
January 28, 2007
To All RADIO AMATEURS

BID: \$ANS-028.04

INTERNATIONAL SPACE STATION STATUS REPORT: SS07-04

HOUSTON - This week, the crew aboard the International Space Station prepared for an unprecedented series of spacewalks. NASA astronauts Mike Lopez-Alegria and Suni Williams are scheduled to begin a 6.5-hour spacewalk from the station around 9 a.m. CST on Wednesday, Jan. 31. It will be the first of a record four spacewalks planned during the next month.

Lopez-Alegria and Williams will conduct other spacewalks on Feb. 4, 8 and 22. The first three spacewalks will originate from the station's Quest airlock and the astronauts will use U.S. spacesuits. Lopez-Alegria and cosmonaut Mikhail Tyurin will use Russian spacesuits for the last spacewalk and will exit the station from the Pirs airlock.

The three U.S. spacewalks will rearrange the station's cooling system, bringing online new portions of the system that were activated during a shuttle mission in December 2006. The Russian spacewalk will free a stuck antenna on the ISS Progress 23 cargo craft docked to the aft end of the station, ensuring that craft can safely undock in April.

The crew began the week unloading some of the more than 2.5 tons of food, fuel and supplies that were delivered to the station on Jan. 19 by the ISS Progress 24 cargo craft, which included fresh produce, gifts from home, new clothing, spare parts, oxygen and water.

The crew's attention quickly turned to preparations for the upcoming spacewalks. On Monday, the crew began working with the U.S. spacesuits. Batteries for the suits were charged, and the suit cooling systems were cleaned.

On Tuesday, Lopez-Alegria and Williams trained using an onboard, laptop computer-based simulation. The training refreshed their skills operating the Simplified Aid for Extravehicular Activity Rescue, or SAFER, jetpack that is worn on spacesuits. The backpack allows spacewalkers to fly back to the station in the event they become separated from the complex.

On Thursday, ground controllers in Houston commanded the station's robotic arm to maneuver into the position it will occupy for the start of the spacewalk. Aboard the station, the crew reviewed the plans for the first spacewalk.

Lopez-Alegria and Williams continued checks of their spacesuits and checks of the SAFER backpacks Friday. The SAFER backpacks are propelled by compressed nitrogen gas, and, during the checkout, the harmless gas was released, depleting the nitrogen in one unit below the usable quantity. Two other usable SAFER backpacks remain onboard, however, and the loss of the third unit does not affect plans for the upcoming spacewalks.

The crew took time during their work on Monday to speak with television host Martha Stewart. Crew members also took time to field questions by amateur radio from two schools, one in Ottawa, Ontario, Canada, and another in Winnebago, Neb.

For more about the crew's activities and station sighting opportunities, visit:

<http://www.nasa.gov/station>

[ANS thanks Arthur, for the above information]

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SB SAT @ AMSAT \$ANS-028.05
Satellite Shorts From All Over

AMSAT News Service Bulletin 028.05
>From AMSAT HQ SILVER SPRING, MD.
January 28, 2007
To All RADIO AMATEURS
BID: \$ANS-028.05

* Ed Long, WA4SWJ, the Editor of The AMSAT Journal is asking for help translating a technical article written in German into English. Ed wrote, "I have a highly interesting technical article for the Journal on oscillator stability but it is written in German. Unfortunately I cannot make the translation and need some help. Is anyone out there able to translate German that could help? John Bubbers used to do that for us but he has retired so I need some assistance. It is several pages long. You'll get credit in the Journal for the translation."

* The Tokyo Institute of Technology Cute-1.7+APD team reported this week that the call sign of C0-56 (also known as Cute-1.7 + APD) had to be changed from JQ1YCC (old call sign) to JQ1YPC (new call sign).
See: http://lss.mes.titech.ac.jp/ssp/cute1.7/index_e.html

* AMSAT-NA server manager Paul, KB5MU reported an outage with all callsign@amsat.org mail aliases (including anything@amsat.org addresses) between 0930z to 1852z on 1/24/07. Service has been restored and no updates were lost. Messages sent to your mail aliases during the outage will have been bounced back to the sender with a "User unknown" error message. You may see some residual error messages still working their way through the worldwide email system, but service at amsat.org should be back to normal now. If you see any ongoing problems with the mail alias system, please notify mail-alias-service@amsat.org and Paul promises to investigate.

* Pehuensat's elusive signal was copied in Buenos Aires, Argentina on 01/21/07 at 21:48 LU (GMT-3). Pehuensat-1 was heard on 145.825 with a weak but clear signal just above noise by ear, but they unable to decode the AX25 packet beacon. The rig was a FT-736 & omni super turn-stile antenna for 2 meters. Engineer Jorge Lassig, director of the Penhuesat Uncoma project informed amateurs that the satellite takes between 48 and 72 hours to charge its batteries, due to the inadequate position of the nosecone to which it is still attached in reference to the sun. Once the batteries are recovered, the satellite transmits during several orbits until they discharge again causing the onboard computer to set the system in safe mode, leaving just the oscillator on. Folks at Uncoma are evaluating when the nosecone will change its position in space to improve the battery charging process of Penhuesat.

[ANS thanks everyone for the above information]

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SB SAT @ AMSAT \$ANS-028.06
Energizing Young Minds

AMSAT News Service Bulletin 028.06
>From AMSAT HQ SILVER SPRING, MD.
January 28, 2007

To All RADIO AMATEURS
BID: \$ANS-028.06

NEWINGTON, CT, Jan 24, 2006 -- Eleven electrical engineering students at The College of New Jersey had a hand in designing some of the software defined radio (SDR) hardware that will fly aboard SuitSat-2. The college seniors signed up last fall for "Software Defined Radio," taught by adjunct professors Bob McGwier, N4HY, and Frank Brickley, AB2KT -- both members of the Amateur Radio on the International Space Station.

The second SuitSat will have a software designed Amateur Radio transponder (SDX) on board. SuitSat-2 is being viewed as a test bed for the hardware AMSAT hopes to launch on its Phase 3E Eagle <http://www.amsat.org/amsat-new/eagle/EaglePedia/index.php/Main_Page> satellite.

Early on, the students studied signal processing and communication theory as well as what Brickley calls "esoteric corners of computer science." Then, using Matlab -- a high-level technical computing language -- the students implemented modulators and demodulators for SSB, FM, BPSK and AFSK.

"Students get a little bit of verbal swimming instruction, and then we toss them straight into the ocean," is how Brickley described the process.

By mid-semester, the students were designing their experiments and getting them up and running. Boards were powered up without diagnostic hardware or software, since that's how the circuitry will be on orbit -- "walking a tightrope without a net," as Brickley sees it.

"Given the complexity of what the SDR/SDX in SuitSat-2 will be required to provide, the applications will need to run in an unprecedented software environment: pre-emptive multitasking under freeRTOS," he explained. FreeRTOS is an open-source, round-robin operating system for embedded devices.

Instead of being scared off, the students ran with the challenge and demonstrated obvious enthusiasm, Brickley reports. "We will be doing a very good thing if we continue to involve these kids, and more like them, in our future AMSAT projects," he said. What surprised him most, he added, was that the students focused on taking new approaches to "very fundamental engineering issues that aren't flashy or trendy." McGwier remarked that both students and teachers shared in the excitement.

The SuitSat-2 team, under the leadership of Lou McFadin, W5DID, has been working on the design of a power converter for the solar panels, the internal housekeeping unit, the antenna mount, the transmitting and receiving hardware and how it will mount atop the suit's helmet. An ISS crew could launch SuitSat-2 during a spacewalk as early as next fall. SuitSat-2 could have an operational lifetime of six months or more.

[ANS Thanks ARRL for this article]

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

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This week's ANS Editor,
Dee Interdonato, NB2F